Table 84.30-1
ABOVE GROUND DRAIN AND VENT PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2661; ASTM F628
Brass	ASTM B43
Cast iron	ASTM A74; CISPI 301
Copper	ASTM B42; ASTM B88; ASTM B306
Galvanized steel	ASTM A53
Lead	FS-WW-P-325B
Polyvinyl chloride (PVC)	ASTM D2665; ASTM D1785
Synthetic rubber hose[a]	AHAM DW-1

Note a: The installation of synthetic rubber hose is limited in use to indirect waste piping or local waste piping from dishwashers in accordance with s. ILHR 82.33 (9) (d).

Table 84.30-2
UNDERGROUND DRAIN AND VENT PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2661; ASTM F628
Cast iron	ASTM A74; CISPI 301
Concrete	ASTM C14; ASTM C76
Copper[a]	ASTM B42; ASTM B88
Polyvinyl chloride (PVC)	ASTM D2665; ASTM D1785
Vitrified clay	ASTM C700

Note a: Copper tubing, type M, may not be installed underground.

Table 84.30-3
SANITARY BUILDING SEWER PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2661; ASTM D2751; ASTM F628
Acrylonitrile butadiene styrene (ABS) composite	ASTM D2680
Cast iron	ASTM A74; CISPI 301
Concrete	ASTM C14; ASTM C76
Copper[b]	ASTM B42; ASTM B88
Polyvinyl chloride (PVC)[a]	ASTM D2665; ASTM D3034; ASTM D1785
Vitrified clay	ASTM C700

Note a: Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.

Note b: Copper tubing, type M, may not be installed underground.

Table 84.30-4
PERFORATED EFFLUENT DISTRIBUTION PIPING FOR NONPRESSURIZED SOIL ABSORPTION SYSTEMS

Material	Standard
Polyethylene (PE)[a]	ASTM F405; ASTM F810
Polyvinyl chloride (PVC)	ASTM D2729

Note a: Polythylene (PE) pipe shall have 2 rows, and only 2 rows, of perforations parallel to the axis of the pipe and 120° ± 5° apart. The perforations shall be at the nominal 4 and 8 o'clock positions when the pipe is installed.

Table 84.30-5
PRESSURIZED DRAIN PIPE AND TUBING AND SERVICE SUCTION LINES

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2282; ASTM D2661; ASTM F628
Acrylonitrile butadiene styrene (ABS) composite	ASTM D2680
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A377; AWWA C115/A21.15; CISPI 301
Chlorinated polyvinyl chloride (CPVC)[a]	ASTM D2846; ASTM F441; ASTM F442
Concrete	ASTM C14; ASTM C76
Copper[b]	ASTM B42; ASTM B88; ASTM B306
Ductile iron	ASTM A377; AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2241; ASTM D2665; ASTM D2672; AWWA C900
Stainless Steel	ANSI B36.19M; ASTM A270; ASTM A450

Note a: Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.

Note b: Copper tubing, type M, may not be installed underground.

(3) STORM AND CLEAR WATER DRAIN AND VENT SYSTEMS. Storm and clear water drain and vent systems shall be of such material and workmanship as set forth in this subsection.

(a) *Above ground drain and vent pipe.* Drain pipe and vent pipe installed above ground and inside a building shall conform to one of the standards listed in Table 84.30-1, except black steel pipe conforming to ASTM A53 may be used for storm water conductors. Black steel conductors may not be embedded in concrete or masonry.

(b) *Underground drain and vent pipe.* Drain pipe and vent pipe installed underground shall conform to one of the standards listed in Table 84.30-2.

(c) *Storm building sewer pipe.* Storm building sewer pipe shall conform to one of the standards listed in Table 84.30-6.

(d) *Subsoil drain pipe.* Subsoil drains shall be open jointed, horizontally split, or perforated pipe conforming to one of the standards listed in Table 84.30-7.

(e) *Roof drains.* 1. Roof drains shall be provided with removable strainers of sufficient strength to carry the anticipated loads.

2. Roof drains shall be so constructed that the drains can be cleaned and the drain inlets accessible at all time.

3. Roof drains shall be sized in accordance with s. ILHR 82.36 and the drain outlet shall not be less than 2½ inches in diameter.

Note: See s. ILHR 82.36 (18) for additional roof drain requirements.

(f) *Area drain inlets.* Area drain inlets shall be constructed in a watertight manner of precast concrete, reinforced monolithic concrete, brick or block, cast iron, coated 12 gauge steel, vitrified clay, fiberglass or other approved materials.

Table 84.30-6
STORM BUILDING SEWER PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2661; ASTM D2751; ASTM F628
Acrylonitrile butadiene styrene (ABS) composite	ASTM D2680
Cast iron	ASTM A74; CISPI 301
Concrete	ASTM C14; ASTM C76
Copper[b]	ASTM B42; ASTM B88
Polyvinyl chloride (PVC)[a]	ASTM D2665; ASTM D3034; ASTM D1785
Vitrified clay	ASTM C700

Note a: Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.

Note b: Copper tubing, type M, may not be installed underground.

TABLE 84.30-7
SUBSOIL DRAIN PIPE AND TUBING

Material	Standard
Cast iron	ASTM A74; CISPI 301
Clay drain tile	ASTM C4
Polyethylene (PE)	ASTM F405
Polyvinyl chloride (PVC)	ASTM D2729 (Perforated only)
Vitrified clay	ASTM C700

(4) WATER SUPPLY SYSTEMS. Water supply systems shall be of such material and workmanship as set forth in this subsection. All materials in contact with water, in a water supply system, shall be suitable for use with potable water. All pipes and pipe fittings for water supply systems shall be made of a material that contains not more than 8.0 percent lead.

(a) *Water quality.* A water supply system shall be resistive to corrosive action and degrading action from the water being conveyed.

(b) *Soil and groundwater.* The installation of water supply systems shall be prohibited in soil and groundwater that is contaminated with solvents, fuels, organic compounds or other detrimental materials which will cause permeation, corrosion, degradation, or structural failure of the piping material.

1. Where detrimental conditions are suspected, a chemical analysis of the soil and groundwater conditions shall be required to ascertain the acceptability of the proposed water supply system materials for the specific installation.

2. Where a detrimental condition exists, no underground water supply system may be installed until the detrimental condition can be:

a. Eliminated and the source of the condition can be eliminated;

b. Identified and the pipe and joining method can be proven resistant to the detrimental condition; or

c. Avoided by choosing an alternate route that will not be affected by the detrimental condition.

(c) *Certification of plastic pipe.* Plastic pipe for a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. Plastic pipe for water supply systems shall bear the certification mark of the testing agency.

(d) *Water services and private water mains.* 1. Water service pipe and private water mains shall conform to one of the standards listed in Table 84.30-8. Pipe and tubing for water services and private water mains shall have a minimum working pressure of 150 psig at 73.4°F.

2. A local governmental unit may by ordinance restrict the types of materials for water services and private water mains which are to be located within or beneath an area subject to an easement for a highway, street or public service right-of-way. Before adopting an ordinance restricting the types of materials for water services the local governmental unit shall submit a copy of the proposed ordinance to the department for review and approval.

3. Existing metallic water service piping or water distribution piping used for electrical grounding shall not be replaced with nonmetallic pipe or tubing until other approved electrical grounding means are provided.

(e) *Water distribution pipe.* 1. Except as provided in subd. 2., water distribution pipe shall have a minimum working pressure of 100 psig at 180°F and shall conform to one of the standards listed in Table 84.30-9.

2. Water distribution pipe installed underground for an exterior turf sprinkler system shall conform to one of the standards listed in Table 84.30-10. Water distribution pipe and fittings for exterior turf sprinkler systems shall have a minimum working pressure of 100 psig at 73.4°F. Water distribution pipe installed above ground for an exterior turf sprinkler system shall conform to subd. 1.

Note: Portions of a water supply system that supply water to a fire sprinkler system are to also conform to the requirements specified in s. ILHR 51.23.

(f) *Bending limitations.* 1. The bending of polybutylene water service pipe or tubing shall be in accordance with the manufacturer's instructions.

2. a. The bending radius of polybutylene water distribution pipe or tubing shall meet or exceed the bending radius specified in Table 84.30-9m and shall meet or exceed the bending radius specified by the manufacturer of the pipe or tubing.

b. Polybutylene water distribution pipe or tubing shall be supported or anchored at the beginning and end of long bends in accordance with the manufacturer's instructions.

Table 84.30-8
PIPE AND TUBING FOR WATER SERVICES AND PRIVATE WATER MAINS

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2282
Brass	ASTM B43
Cast iron	ASTM A377; AWWA C115/A21.15
Chlorinated polyvinyl chloride (CPVC)[a]	ASTM D2846; ASTM F441; ASTM F442
Copper[b]	ASTM B42; ASTM B88
Ductile iron	ASTM A377; AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polybutylene (PB)[a]	ASTM D2662; ASTM D2666; ASTM D3000; ASTM D3309
Polyethylene (PE)[a]	ASTM D2239; ASTM D2737; ASTM D2104; ASTM D2447; ASTM D3035
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2241; ASTM D2672; AWWA C900
Stainless steel	ANSI B36.19

Note a: Plastic water service systems shall be installed in accordance with ASTM D2774. See Appendix for further explanatory material.

Note b: Copper tubing, type M, may not be installed underground.

Table 84.30-9
WATER DISTRIBUTION PIPE AND TUBING

Material	Standard
Brass	ASTM B43
Cast iron	ASTM A377; AWWA C115/A21.15
Chlorinated polyvinyl chloride (CPVC)[a]	ASTM D2846
Copper[b]	ASTM B42; ASTM B88
Ductile iron	ASTM A377; AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polybutylene (PB)[a] for agricultural use and pure-water use	ASTM D3309
Stainless steel	ANSI B36.19M; ASTM A270; ASTM A450

Note a: Plastic pipe and tubing installed underground shall be in accordance with ASTM D2774. See Appendix for further explanatory material.

Note b: Copper tubing, type M, may not be installed underground.

Table 84.30-9m
MINIMUM BENDING RADIUS OF POLYBUTYLENE WATER DISTRIBUTION PIPE AND TUBING

Pipe Size (inches)	Bending Radius (inches)	Tubing Size (inches)	Bending Radius (inches)
¾	12¾	¼	4½
1	15¾	⅜	6
1¼	20	½	7½
1½	23	¾	10½
2	28½	1	13½
		1¼	16½
		1½	19½
		2	25½

Note: See Appendix for further explanatory material.

Table 84.30-10
EXTERIOR TURF SPRINKLER SYSTEM PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2282
Brass	ASTM B43
Cast iron	ASTM A377; AWWA C115/A21.15
Chlorinated polyvinyl chloride (CPVC)[a]	ASTM F441; ASTM F442; ASTM D2846
Copper[b]	ASTM B88
Ductile iron	ASTM A377; AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polybutylene (PB)[a]	ASTM D2666; ASTM D3000; ASTM D2662; ASTM D3309
Polyethylene (PE)[a]	ASTM D2104; ASTM D2239; ASTM D2447; ASTM D3035; ASTM D2737
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2241; ASTM D2672; AWWA C900

Note a: Plastic pipe and tubing installed underground shall be in accordance with ASTM D2774. See Appendix for further explanatory material.

Note b: Copper tubing, type M, may not be installed underground.

(5) PIPE FITTINGS AND VALVES. (a) *Fittings.* Pipe fittings shall conform to the pipe material standards listed in this chapter or one of the standards listed in Table 84.30-11. Threaded drain pipe fittings shall be of the recessed drainage type.

(b) *Water supply valves.* 1. Control valves for water services and private water mains shall be designed and constructed to withstand a minimum pressure of 125 psig at 73.4°F.

2. Control valves for water distribution systems shall be designed and constructed to withstand a minimum pressure of 100 psig at 180°F.

3. A control valve for water supply piping 3/4 inches through 4 inches in diameter which serves 2 or more plumbing fixtures shall have a nominal diameter at least equal to the piping and shall have a minimum Cv factor as specified in Table 84.30-10a.

Table 84.30-10a
MINIMUM Cv FACTORS

Nominal Valve Diameters	Cv Factors
¾	18
1	35.5
1¼	61
1½	107
2	175
3	255
4	340

Note: The Cv factor is defined as the flow coefficient for valves, expressing the flow rate in gallons per minute of 60° with a one psi pressure drop across the valve.

(c) *Special fittings and valves.* 1. Water hammer arrestors shall conform to ANSI A112.26.1 or ASSE 1010.

2. Relief valves and automatic gas shutoff devices for hot water supply systems shall conform to ANSI Z21.22.

3. Water pressure reducing valves and strainers for water pressure reducing valves for domestic supply systems shall conform to ASSE 1003.

4. Hose connection vacuum breakers shall conform to ASSE 1011 or ASSE 1019.

5. Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012.

6. Reduced pressure principle backflow preventers shall conform to ASSE 1013.

7. Backwater valves shall conform to ANSI A112.14.1.

8. Pipe applied atmospheric type vacuum breakers shall conform to ASSE 1001.

9. Laboratory faucet vacuum breakers shall conform to ASSE 1035.

10. Trap seal primer valves shall conform to ASSE 1018.

(d) *Pipe saddles.* Pipe saddles shall be installed in accordance with the instructions of the saddle manufacturer and the following limitations:

1. Pipe saddles may be installed on private interceptor main sewers, building sewers, underground drain and vent pipe and tubing, and where otherwise approved by the department;

2. A saddle for drain piping shall have a radius in accordance with s. ILHR 82.30 (8) (a);

3. The material of the saddle shall be compatible with the materials of the pipes which are to be connected to the saddle;

4. The hole in the pipe which is to receive the saddle shall be drilled or cored to match the saddle outlet;

5. Straps or clamps which wrap around the pipe and saddle shall be provided by the manufacturer of the saddle;

6. Saddles shall be installed with straps or clamps which wrap around the pipe and saddle; and

7. Proper hangers or bedding shall be provided to maintain alignment between the opening in the pipe and the saddle.

Table 84.30-11
PIPE FITTINGS

Material	Standard
Acrylonitrile butadiene styrene (ABS)	ASTM D2468; ASTM D3311; ASTM F409
Cast bronze	ANSI B16.15; ANSI B16.24
Cast copper alloy	ANSI B16.18; ANSI B16.23; ANSI B16.26; ANSI B16.32
Cast iron	ANSI B16.4; ANSI B16.12; ANSI B16.1
Chlorinated polyvinyl chloride (CPVC)	ASTM F437; ASTM F438; ASTM F439
Copper	ANSI B16.22; ASNI B16.29; ANSI B16.43
Ductile iron and gray iron	ANSI/AWWA C110/A21.10; ANSI/AWWA C153/A21.53; ANSI B16.42
Malleable iron	ANSI B16.3
Polybutylene (PB)	ASTM D3309; ASTM F845
Polyethylene (PE)	ASTM D2609; ASTM D2683; ASTM D3261
Polyvinyl chloride (PVC)	ASTM D2464; ASTM D2466; ASTM D2467; ASTM D3311; ASTM F409
Stainless steel	ASTM A403
Steel[a]	ANSI B16.5; ANSI B16.9; ANSI B16.11; ANSI B16.28
Styrene-rubber (SR)	ASTM D2852

Note a: Steel fittings and mallable iron fittings to be used in a water supply system shall be galvanized-coated in accordance with ASTM A123.

Note b: See s. ILHR 84.30 (4) (intro.) concerning the maximum lead content for fittings.

(6) SPECIAL MATERIALS. (a) *Sheet lead.* Sheet lead for the following uses may not weigh less than indicated in subds. 1. to 3.

1. Safe pans, 4 pounds per square foot;

2. Site-fabricated flashings for vent pipes, 3 pounds per square foot; and

3. Prefabricated flashings for vent pipes, 2½ pounds per square foot.

(b) *Traps and fixture drain connection fittings.* Copper or tubular brass traps and fixture drain connections fittings shall be at least of 20 gage material.

(c) *Sheet copper.* Sheet copper for the following uses may not weigh less than indicated in subds. 1. and 2. and shall conform to ASTM B152.

1. Safe pans, 12 ounces per square foot;

2. Flashing for vent pipes, 8 ounces per square foot; and

3. Flush tank linings, 10 ounces per square foot.

(d) *Cleanout plugs.* Cleanout plugs shall be of brass or plastic. Brass cleanout plugs shall be used with metallic piping only and shall conform to ASTM A74. Plastic cleanout plugs shall conform to the requirements of sub. (5) (a).

(e) *Flush pipes and fittings.* Flush pipes and fittings shall be of nonferrous material and shall conform to ANSI A112.19.5.

(f) *Safing materials.* Safing materials made from chlorinated polyethylene shall conform to ASTM D4068.

History: Cr. Register, May, 1988, No. 389, eff. 6-1-88; am. (4) (intro.), Register, August, 1988, No. 392, eff. 9-1-88; renum. (2) (e) to (g) to (f) to (h), cr. (2) (e), am. Table 84.30-4, r. and recr. Table 84.30-5, Register, August, 1991, No. 428, eff. 9-1-91; am. (2) (c), (d) 1. and (e), r. (2) (d) 3., renum. (2) (d) 4. to be (2) (d) 3., cr. (2) (i), Register, April, 1992, No. 436, eff. 5-1-92; am. (3) (a), Tables 1, 3 to 9, 10 and 11, Register, September, 1992, No. 441, eff. 10-1-92.

ILHR 84.40 Joints and connections. (1) GENERAL. (a) *Tightness.* Joints and connections in the plumbing system shall be watertight and gastight for the pressure required by test or the system design, whichever is greater, with the exception of perforated or open joint piping.

Note: The testing requirements for tightness are in s. ILHR 82.21.

(b) *Preparation of pipe ends.* Pipe ends shall be prepared in accordance with the applicable pipe standard or the pipe or fitting manufacturer's instructions.

(c) *Prohibited joints and connections.* Unless otherwise permitted in this chapter or ch. ILHR 82 or 83, the following types of joints and connections shall be prohibited:

1. Cement or concrete joints;

2. Mastic or hot poured bituminous joints;

3. Elastomeric rolling o-rings between different diameter pipes;

4. Solvent cement joints between different types of plastic pipe; and

5. Roll grooving of galvanized steel pipe.

(2) ABS PLASTIC PIPE. Joints between acrylonitrile butadiene styrene plastic pipe or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1. Drain and vent systems. Mechanical push-on joints for drain and vent systems shall conform to ASTM D3212.

2. Water supply systems. Mechanical push-on joints and mechanical compression-type joints for water supply systems which use a flexible elastomeric seal shall conform to ASTM D3139.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2235 and its appendix, ASTM D2661 or ASTM F628.

1. Joint surfaces shall be clean and free of moisture.

2. Solvent cement conforming to ASTM D2235 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.

3. Solvent cement shall be handled in accordance with ASTM F402.

4. Solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized

testing agency as to conforming to NSF 14. The container for the solvent cement shall bear the certification mark of the testing agency.

Note: See Appendix for further explanatory material.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ANSI B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(3) BLACK STEEL PIPE. Joints between black steel pipe or fittings shall be in accordance with pars. (a) to (d).

(a) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than 1/8 inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only in a vertical position.

2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(d) *Welded joints.* Joints between black steel pipe or fittings may be welded.

(4) BRASS PIPE. Joints between brass pipe or fittings shall be in accordance with the provisions of pars. (a) to (d).

(a) *Brazed joints.* All joint surfaces to be brazed shall be cleaned bright by other than chemical means. Brazing filler metal conforming to AWS A5.8 or other approved material shall be used. The joining of water supply piping shall be made with lead-free materials. "Lead-free " shall mean a chemical composition equal to or less than 0.2% of lead.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall conform to ASTM D3139.

(c) *Soldered joints.* All joint surfaces to be soldered shall be cleaned bright by other than chemical means. A nontoxic flux shall be applied to all joint surfaces. Solder conforming to ASTM B32 or other approved material shall be used. The joining of water supply piping shall be made with lead-free materials. "Lead-free" shall mean a chemical composition equal to or less than 0.2% of lead.

(d) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(5) CAST IRON PIPE. Joints between cast iron pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Caulked joints.* 1. Drain and vent systems. Caulked joints for hub and spigot pipe of drain and vent systems shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than ⅛ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

2. Water supply systems. Joints for bell and spigot pipe of water supply systems shall be firmly packed with treated paper rope. Molten lead shall be poured in one operation to a depth of 2½ inches.

(b) *Mechanical joints.* 1. Drain and vent systems. a. Mechanical push-on joints for drain and vent systems shall have gaskets which conform to ASTM C564.

b. Mechanical sleeve joints for drain and vent systems shall have a rubber sealing sleeve conforming to ASTM C564, CISPI 310 or FM 1680. Where a stainless steel band assembly is used, the band assembly shall conform to CISPI 310 or FM 1680. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

2. Water supply systems. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111/A21.11. Lead tipped gaskets may not be used.

(c) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(6) CPVC PLASTIC PIPE. Joints between chlorinated polyvinyl chloride plastic pipe or fittings shall be installed in accordance with the provisions of pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on type joints which use flexible elastomeric seals shall conform to ASTM D3139.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2846 and its Appendix or ASTM F493 and its Appendix.

1. Joint surfaces shall be clean and free of moisture. A primer conforming to ASTM F656 shall be applied to all joint surfaces. The primer shall be purple in color.

2. Solvent cement conforming to ASTM F493 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.

3. Solvent cement shall be handled in accordance with ASTM F402.

4. Solvent cement shall be orange in color.

5. Primer and solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. The containers for the primer and the solvent cement shall bear the certification mark of the testing agency.

Note: See Appendix for further exaplanatory material.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ANSI B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(7) CONCRETE PIPE. Joints between concrete pipe or fittings shall be made by use of an elastomeric seal conforming to ASTM C443.

(8) COPPER PIPE AND TUBING. Joints between copper pipe, tubing or fittings shall be installed in accordance with pars. (a) to (e).

(a) *Brazed joints.* All joint surfaces to be brazed shall be cleaned bright by other than chemical means. Brazing filler metal conforming to AWS A5.8 or other approved material shall be used. The joining of water supply piping shall be made with lead-free materials. "Lead-free" shall mean a chemical composition equal to or less than 0.2% of lead.

(b) *Flared joints.* Flared joints may be used on annealed tubing for water supply systems and shall be made by the use of a tool designed for that operation.

(c) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall conform to ASTM D3139.

(d) *Soldered joints.* All joint surfaces to be soldered shall be cleaned bright by other than chemical means. A nontoxic flux shall be applied to all joint surfaces. Solder conforming to ASTM B32 or other approved material shall be used. The joining of water supply piping shall be made with lead-free materials. "Lead-free" shall mean a chemical composition equal to or less than 0.2% of lead.

(e) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(9) DUCTILE IRON PIPE. (a) *Mechanical joints.* Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111/A21.11. Lead tipped gaskets may not be used.

(b) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(10) GALVANIZED STEEL PIPE. Joints between galvanized steel pipe or fittings or between galvanized steel pipe and cast iron fittings shall be installed in accordance with pars. (a) to (c).

(a) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall conform to ASTM D3139.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be

firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than on inch deep and not to extend more than 1/8 inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only for piping in a vertical position.

2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(11) LEAD PIPE. Joints between lead pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Burned joints.* Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be at least as thick as the lead being joined. The filler metal shall be of the same material as the pipe.

(b) *Wiped joints.* A wiped joint shall be full wiped, having an exposed surface on each side of the joint not less than 3/4 inch and shall be at least 3/8 inch thick at the thickest point.

(12) PB PLASTIC PIPE AND TUBING. Joints between polybutylene plastic pipe and tubing or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Flared joints.* Flared joints shall be made by use of a tool designed for that operation. Flared joints shall be made in accordance with ASTM D3140.

(b) *Heat fusion joints.* Heat fusion joints shall be made in accordance with ASTM D2657 and ASTM D3309. Heat fusion joints shall be of a socket fusion type.

1. Joint surfaces to be fused shall be clean and free of moisture.

2. All joint surfaces shall be heated to the temperature recommended by the pipe or fitting manufacturer and joined.

3. The joint shall be undisturbed until cool.

(c) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints which use flexible elastomeric seals shall conform to ASTM D3139.

(13) PE PLASTIC PIPE AND TUBING. Joints between polyethylene plastic pipe, tubing or fittings shall be in accordance with pars. (a) to (c).

(a) *Flared joints.* Flared joints shall be made by use of a tool designed for that operation. Flared joints shall be made in accordance with ASTM D3140.

(b) *Heat fusion joints.* Heat fusion joints shall be made in accordance with ASTM D2657. Heat fusion joints shall be of a socket fusion type.

1. Joint surfaces to be fused shall be clean and free of moisture.

2. All joint surfaces shall be heated to the temperature recommended by the pipe or fitting manufacturer and joined.

3. The joint shall be undisturbed until cool.

(c) *Mechanical joints.* Mechanical joints may be installed in accordance with the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints which use flexible elastomeric seals shall conform to ASTM D3139.

(14) PVC PLASTIC PIPE. Joints between polyvinyl chloride plastic pipe or fittings shall be in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1. Drain and vent systems. Mechanical push-on joints for drain and vent systems shall conform to ASTM D3212.

2. Water supply systems. Mechanical push-on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall conform to ASTM D3139.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2855.

1. Joint surfaces shall be clean and free of moisture. A primer conforming to ASTM F656 shall be applied to all joint surfaces.

2. Solvent cement conforming to ASTM D2564 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.

3. Solvent cement shall be handled in accordance with ASTM F402.

4. Primer and solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. The containers for the primer and the solvent cement shall bear the certification mark of the testing agency.

Note: See Appendix for further explanatory material.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ANSI B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(15) STAINLESS STEEL. Joints between stainless steel pipe or fittings shall be installed in accordance with the provisions of pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push-on type joints which use flexible elastomeric seals shall conform to ASTM D3139.

(b) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(c) *Welded joints.* Joints between stainless steel pipe or fittings may be welded.

(16) VITRIFIED CLAY PIPE. Joints between vitrified clay pipe or fittings shall be made by use of elastomeric seals conforming to ASTM C425.

(17) JOINTS BETWEEN PIPE AND FITTINGS OF DIFFERENT MATERIALS. Connections between pipes of different materials shall be made with mechanical compression type joints, installed in accordance with manufacturer's instructions or as specified in pars. (a) to (e).

(a) *Copper to cast iron.* Connections between copper pipe or tube and cast iron pipe shall be by means of either caulked joints in accordance with sub. (5) (a) or threaded fittings in accordance sub. (5) (c).

(b) *Copper to galvanized steel.* Connections between copper pipe or tube and galvanized steel pipe shall be by use of an adapter fitting. The copper pipe shall be soldered to the adapter in accordance with sub. (8) (d). The galvanized steel shall be threaded to the adapter in accordance with sub. (10) (a).

(c) *Cast iron to steel or brass pipe.* Connections between cast iron pipe and galvanized or black steel or brass pipe shall be by means of:

1. Caulked joints in accordance with sub. (5) (a); or

2. Threaded joints in accordance with sub. (5) (c).

(d) *Plastic to other materials.* 1. Connections between plastic pipe and cast iron pipe shall be by means of:

a. Caulked joints in accordance with sub. (5) (a); or

b. Threaded joints in accordance with sub. (5) (c).

2. Connections between different types of plastic pipe or between plastic pipe and other piping materials other than cast iron shall be by means of threaded joints in accordance with sub. (14) (c).

(e) *Lead to other piping materials.* Connections between lead pipe and other piping materials shall be by use of an adapter fitting conforming to s. ILHR 84.30 (5) (a). The lead pipe shall be caulked or burned to the adapter fitting in accordance with sub. (11).

(18) CONNECTION OF FIXTURES. Flanged fixtures which have integral traps shall be mechanically fastened to the drain piping by means of a compatible fitting. The joint between the fixture and the fitting shall be sealed with a watertight gasket or setting compound.

History: Cr. Register, May, 1988, No. 389, eff. 6-1-88; am. (5) (b) 1. b., Register, September, 1992, No. 441, eff. 10-1-92.

ILHR 84.50 Alternate approvals and experimental approvals. (1) GENERAL. The provisions of chs. ILHR 82 to 84 are not intended to prevent the use of a plumbing material or product not specifically addressed therein if the plumbing material or product has been approved by the department.

(2) ALTERNATE APPROVAL. (a) Plumbing materials or products determined by the department to comply with the intent of chs. ILHR 82 to 84 and ch. 145, Stats., and not approved under s. ILHR 84.10, shall be issued an alternate approval. Alternate approvals shall be issued by the department in writing.

(b) The department may require the submission of any information deemed necessary for review. Sufficient evidence shall be submitted to the department to substantiate:

1. Assertions of function and performance; and

2. Compliance with the intent of chs. ILHR 82 to 84 and ch. 145, Stats.

(c) The department shall review and make a determination on an application for alternate approval within 3 months of receipt of all information and fees required to complete the review.

(d) The department may impose specific conditions in issuing an alternate approval, including an expiration date for the alternate approval. Violations of the conditions under which an alternate approval is issued shall constitute a violation of this chapter.

(e) If, upon review, the department determines that a plumbing material or product does not comply with the intent of chs. ILHR 82 to 84 and ch. 145, Stats., the request for alternate approval shall be denied in writing.

(3) EXPERIMENTAL APPROVAL. (a) The department may allow the installation of a plumbing material or product for the purpose of proving compliance with the intent of chs. ILHR 82 to 84 and ch. 145, Stats.

(b) An experimental approval shall be required for each plumbing material or product to be installed for the purpose of proving compliance with the intent of chs. ILHR 82 to 84 and ch. 145, Stats. A separate experimental approval shall be obtained for each product where such a product is to be used. Experimental approvals shall be issued by the department in writing. Experimental approvals shall be denied by the department in writing.

(c) The department may require the submission of any information deemed necessary for review.

(d) The department may limit the number of applications it will accept for experimental approval of products.

(e) The department shall review and make a determination on an application for experimental approval within 6 months of receipt of all information and fees required to complete the review.

(f) The department may impose specific conditions in issuing an experimental approval. Violations of the conditions under which an experimental approval is issued shall constitute a violation of this chapter.

(g) If the department issues an experimental approval:

1. Plans detailing the installation of the plumbing material or product shall be submitted to the department in accordance with s. ILHR 82.20 (4) or 83.07 (2).

2. A copy of the experimental approval shall be attached to the submitted plans and approved plans.

3. A letter of consent from the owner of the installation shall be attached to the submitted plans and approved plans. The letter shall acknowledge that the owner has received and read a copy of the experimental approval and s. ILHR 84.50.

4. The completed installation shall be inspected for compliance with the approved plans by the department. A report on the completed installation shall be written by the department.

5. A written report, from the party who was issued the experimental approval, shall be submitted to the department detailing the function and performance of the installed plumbing material or product. The report shall be completed at time intervals specified by the department, but not less than once a year.

6. On-site inspections shall be performed by the department at time intervals specified by the department, but not less than once a year. A report on the inspection shall be written by the department. The department may assess a fee for the inspection.

7. Five years after the date of the completed installation the department shall within 6 months order the removal of the plumbing material or product or issue an alternate approval.

(h) If chs. ILHR 82 to 84 or ch. 145, Stats., are revised to include or permit an experimental plumbing material or product to conform with the intent of chs. ILHR 82 to 84 and ch. 145, Stats., the department shall waive the requirements of par. (f) as to that material or product.

(4) MODIFICATIONS. If a plumbing material or product with an alternate or experimental approval or the installation of an experimentally approved plumbing material or product is modified or additional assertions of function or performance are made, the alternate or experimental approval shall be considered null and void, unless the product is resubmitted to the department for review and the approval is reaffirmed.

(5) REVOCATION. The department may revoke an alternate or experimental approval issued under this section for any false statements or misrepresentations of facts or data on which the alternate or experimental approval was based or as a result of product failure.

(6) LIMITATIONS. An alternate or experimental approval of a plumbing material or product issued by the department may not be construed as an assumption of any responsibility for defects in design, construction, or performance of any plumbing material or product nor for any damages that may result.

(7) FEES. Fees for the review of a plumbing material or product under this section and any required on-site inspections shall be submitted in accordance with s. Ind 69.23 (5) (d) or (e), and (f).

History: Cr. Register, May, 1988, No. 389, eff. 6-1-88; correction in (7) made under s. 13.93 (2m) (b) 7, Stats., Register, August, 1988, No. 392.

ILHR 84.60 Incorporation of standards by reference. (1) CONSENT. Pursuant to s. 227.025, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the standards listed in sub. (4).

(2) COPIES. Copies of the adopted standards are on file in the offices of the department, the secretary of state and the revisor of statutes. Copies may be purchased through the respective organizations listed in Tables 84.60-1 to 84.60-10.

(3) INTERIM AMENDMENTS. Interim amendments of the adopted standards shall have no effect in the state until such time as this section is correspondingly revised to reflect the changes.

(4) ADOPTION OF STANDARDS. The standards referenced in Tables 84.60-1 to 84.60-10 are hereby incorporated by reference into this chapter.

Table 84.60-1

AHAM	Association of Home Appliance Manufacturers 20 North Wacker Drive Chicago, Illinois 60606

Standard Reference Number	Title
DW-1-82	Household Dishwashers

Table 84.60-2

ANSI	American National Standards Institute, Inc. 1430 Broadway New York, New York 10018

	Standard Reference Number	Title
1.	A112.6.1M-79	Supports for Off-the-Floor Plumbing Fixtures for Public Use
2.	A112.14.1-75	Backwater Valves
3.	A112.18.1M-89	Plumbing Fixture Fittings
4.	A112.19.1M-87	Enameled Cast Iron Plumbing Fixtures
5.	A112.19.2M-82	Vitreous China Plumbing Fixtures
5m.	A112.19.2M-90	Vitreous China Plumbing Fixtures
6.	A112.19.3M-87	Stainless Steel Plumbing Fixtures (Designed for Residential Use)
7.	A112.19.4-84	Porcelain Enameled Formed Steel Plumbing Fixtures
8.	A112.19.5-79	Trim for Water Closet Bowls, Tanks and Urinals (Dimensional Standards)
8m.	A112.19.6-90	Hydraulic Requirements for Water Closets and Urinals
9.	A112.21.1M-80	Floor Drains
10.	A112.21.2M-83	Roof Drains
11.	A112.26.1-84	Water Hammer Arrestors
12.	B1.20.1-83	Pipe Threads, General Purpose (Inch)
13.	B16.1-75	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
14.	B16.3-77	Malleable Iron Threaded Fittings, Class 150 and 300
15.	B16.4-77	Cast Iron Threaded Fittings, Class 125 and 250

	Standard Reference Number	Title
16.	B16.5-81	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
17.	B16.9-78	Factory-Made Wrought Steel Buttwelding Fittings
18.	B16.11-80	Forged Steel Fittings, Socket-Welded and Threaded
19.	B16.12-83	Cast Iron Threaded Drainage Fittings
20.	B16.15-78	Cast Bronze Threaded Fittings, Class 125 and 250
21.	B16.18-78	Cast Copper Alloy Solder-Joint Pressure Fittings
22.	B16.22-80	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
23.	B16.23-76	Cast Copper Alloy Solder Joint Drainage Fittings (DWV)
24.	B16.24-79	Bronze Pipe Flanges and Flanged Fittings, Class 150 and 300
25.	B16.26-83	Cast Copper Alloy Fittings for Flared Copper Tubes
26.	B16.28-78	Wrought Steel Buttwelding Short Radius Elbows and Returns
27.	B16.29-80	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings (DWV)
28.	B16.32-79	Cast Copper Alloy Solder Joint Fittings for Sovent Drainage Systems
29.	B16.42-79	Fittings, Class 150 and 300, Ductile Iron Pipe Flanges and Flanged
30.	B16.43-82	Wrought Copper and Copper Alloy Solder Joint Fittings for Sovent Drainage Systems
31.	B36.19M-85	Stainless Steel Pipe
32.	Z21.22-86	Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems
33.	Z124.1-87	Plastic Bathtub Units
34.	Z124.2-87	Plastic Shower Receptors and Shower Stalls
35.	Z124.3-86	Plastic Lavatories
36.	Z124.4-86	Plastic Water Closet Bowls and Tanks

Table 84.60-3

ARI	Air-Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, Virginia 22209
Standard Reference Number	Title
ARI-1010-84	Drinking-Fountains and Self-Contained, Mechanically-Refrigerated Drinking-Water Coolers

Table 84.60-4

ASSE	American Society of Sanitary Engineering P.O. Box 9712 Bay Village, Ohio 44140
Standard Reference Number	Title
1. 1001-90	Pipe Applied Atmospheric Type Vacuum Breakers
2. 1002-86	Water Closet Flush Tank Ball Cocks
3. 1003-82	Water Pressure Reducing Valves for Domestic Water Supply Systems
4. 1004-90	Commercial Dishwashing Machines
5. 1005-86	Water Heater Drain Valves, ¾" Iron Pipe Size
6. 1006-86	Residential Use (Household) Dishwashers
7. 1007-86	Home Laundry Equipment
8. 1008-86	Household Food Waste Disposer Units
9. 1009-90	Commercial Food Waste Grinder Units
10. 1010-82	Water Hammer Arrestors
11. 1011-82	Hose Connection Vacuum Breakers
12. 1012-78	Backflow Preventers with Intermediate Atmospheric Vent
13. 1013-88	Reduced Pressure Principle Backflow Preventers, Including Appendix
14. 1014-90	Handheld Showers
15. 1018-86	Trap Seal Primer Valves, Water Supply Fed
16. 1019-78	Wall Hydrants, Frost Proof Automatic Draining, Anti-Backflow Types
17. 1023-79	Hot Water Dispensers, Household Storage Type, Electrical
18. 1025-78	Diverters for Plumbing Faucets with Hose Spray, Anti-Siphon Type, Residential Applications
19. 1035-84	Laboratory Faucet Vacuum Breakers

Table 84.60-5

ASTM		American Society for Testing and Materials 1916 Race Street Philadelphia, Pennsylvania 19103
	Standard Reference Number	Title
1.	A53-90a	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless, Specification for
2.	A74-87	Cast Iron Soil Pipe and Fittings, Specification for
4.	A123-89a	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates and Strip, Specification for
5.	A270-90	Seamless and Welded Austenitic Stainless Steel Sanitary Tubing, Specification for
6.	A377-89	Gray Iron and Ductile Iron Pressure Pipe, Specification for
7.	A403-90	Wrought Austenitic Stainless Steel Piping Fittings, Specification for
8.	A450-89	General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes, Specification for
9.	B32-89	Solder Metal, Specification for
10.	B42-89	Seamless Copper Pipe, Standard Sizes, Specification for
11.	B43-91	Seamless Red Brass Pipe, Standard Sizes, Specification for
12.	B75-86	Seamless Copper Tube, Specification for
13.	B88-89	Seamless Copper Water Tube, Specification for
14.	B152-88	Copper Sheet, Strip, Plate, and Rolled Bar, Specification for
15.	B251-88	General Requirements for Wrought Seamless Copper and Copper-Alloy Tube, Specification for
16.	B302-88	Threadless Copper Pipe, Specification for

	Standard Reference Number	Title
17.	B306-88	Copper Drainage Tube (DWV), Specification for
18.	C4-62(1986)	Clay Drain Tile, Specification for
19.	C14-90	Concrete Sewer, Storm Drain, and Culvert Pipe, Specification for
20.	C76-90	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, Specification for
21.	C425-90a	Compression Joints for Vitrified Clay Pipe and Fittings, Specification for
22.	C443-85a(1990)	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets, Specification for
23.	C564-88	Rubber Gaskets for Cast Iron Soil Pipe and Fittings, Specification for
24.	C700-89a	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated, Specification for
25.	D1527-89	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80, Specification for
26.	D1785-89	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120, Specification for
27.	D2104-89	Polyethylene (PE) Plastic Pipe, Schedule 40, Specification for
28.	D2235-89	Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings, Specification for
29.	D2239-89	Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter, Specification for
30.	D2241-89	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR), Specification for
31.	D2282-89	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR), Specification for
32.	D2321-89	Underground Installation of Thermoplastic Pipe, for Sewers and Other Gravity-Flow Applications, Practice for
33.	D2447-89	Polyethylene (PE) Plastic Pipe, Schedules 40 and 80 Based on Outside Diameter, Specification for
34.	D2464-90	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Specification for
36.	D2466-90a	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40, Specification for
37.	D2467-90	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Specification for

	Standard Reference Number	Title
38.	D2468-89	Acrylonitrile-Butadiene-Styrene (ABS), Plastic Pipe Fittings, Schedule 40, Specification for
40.	D2564-88	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Specification for
41.	D2609-90	Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe, Specification for
42.	D2657-90	Heat-Joining of Polyolefin Pipe and Fittings, Specification for
43.	D2661-90	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings, Specification for
44.	D2662-89	Polybutylene (PB) Plastic Pipe (SIDR-PR), Based on Controlled Inside Diameter, Specification for
45.	D2665-91b	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings, Specification for
46.	D2666-89	Polybutylene (PB) Plastic Tubing, Specification for
47.	D2672-89	Bell-End Poly (Vinyl Chloride) (PVC) Pipe, Specification for
48.	D2680-90	Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping, Specification for
49.	D2683-90	Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing, Specification for
50.	D2729-89	Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Specification for
51.	D2737-89	Polyethylene (PE) Plastic Tubing, Specification for
53.	D2751-89	Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings, Specification for
54.	D2774-72(1983)	Underground Installation of Thermoplastic Pressure Piping, Recommended Practice for
55.	D2846-90	Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems, Specification for
56.	D2852-89	Styrene-Rubber (SR) Plastic Drain Pipe and Fittings, Specification for

	Standard Reference Number	Title
57.	D2855-90	Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings, Practice for
58.	D3000-89	Polybutylene (PB) Plastic Pipe (SDR-PR) Based on Outside Diameter, Specification for
60.	D3034-89	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Specification for
61.	D3035-89a	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter, Specification for
63.	D3139-89	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals, Specification for
64.	D3140-90	Flaring Polyolefin Pipe and Tubing, Practice for
66.	D3212-89	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals, Specification for
67.	D3261-90	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, Specification for
69.	D3309-89a	Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems, Specification for
70.	D3311-90a	Drain, Waste, and Vent (DWV) Plastic Fittings Patterns, Specification for
71.	D4068-89	Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane, Specification for
72.	F402-88	Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings, Practice for
73.	F405-89	Corrugated Polyethylene (PE) Tubing and Fittings, Specification for
74.	F409-88	Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings, Specification for
75.	F437-89b	Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80, Specification for
76.	F438-90	Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40, Specification for
77.	F439-90	Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80, Specification for

	Standard Reference Number	Title
78.	F441-89	Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80, Specification for
79.	F442-89	Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR), Specification for
81.	F477-76(1985)	Elastomeric Seals (Gaskets) for Joining Plastic Pipe, Specification for
82.	F493-89	Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings, Specification for
83.	F628-91	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core, Specification for
84.	F656-89a	Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Specification for
84m.	F810-85	Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields, Specification for
85.	F845-88	Plastic Insert Fittings for Polybutylene (PB) Tubing, Specification for

Table 84.60-6

AWS	American Welding Society 2501 N.W. 7th Street Miami, Florida 33125

Standard Reference Number	Title
AWS A5.8-89	Filler Metals for Brazing, Specification for

Table 84.60-7

AWWA	American Water Works Association Data Processing Department 6666 West Quincy Avenue Denver, Colorado 80235

	Standard Reference Number	Title
1.	C110/A21.10-87	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids
2.	C111/A21.11-90	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
3.	C115/A21.15-88	American National Standard for Flanged Ductile-Iron and Gray-Iron Pipe with Threaded Flanges
4.	C151/A21.51-86	American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
5.	C153/A21.53-88	American National Standard for Ductile-Iron Compact Fittings, 3 in. through 16 in., for Water and Other Liquids
6.	C900-89	American Water Works Association Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution

Table 84.60-8

	CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Road, Suite 203 McLean, Virginia 22101
	Standard Reference Number	Title
1.	301-90	Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications, Specification for
2.	310-90	Coupling for use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications, Specification for

Table 84.60-8m

FMRC	Factory Mutual Research Corp. 1151 Boston-Providence Turnpike Norwood, Massachusetts 02062
Standard Reference Number	Title
1680	Couplings used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems Above and Below Ground, Industrial/ Commercial and Residential, January 1989

Table 84.60-9

FS	Federal Specifications* National Bureau of Standards Office of Engineering Standards U.S. Department of Commerce Washington, D.C. 20234 *Standards are available from the Superintendent of Documents U.S. Government Printing Office, Washington, D.C. 20402
Standard Reference Number	Title
WW-P-325B	Pipe, Bends, Traps, Caps and Plugs; Lead (For Industrial Pressure, and Soil and Waste Applications), June 9, 1976

Table 84.60-10

NSF	National Sanitation Foundation 3475 Plymouth Road P.O. Box 1468 Ann Arbor, Michigan 48106

Standard Reference Number	Title
Standard 14-90	Plastic Piping Compounds and Related Materials

Table 84.60-11

Standard Reference Number	Title
WQA	Water Quality Association 4151 Naperville Road Lisle, Illinois 60532
Standard Reference Number	Title
S-100-85	Household, Commercial and Portable Exchange Water Softeners

History: Cr. Register, May, 1988, No. 389, eff. 6-1-88; am. Table 84.60-5, r. and recr. Table 84.60-9, Register, August, 1991, No. 428, eff. 9-1-91; am. Table 84.60-2, Register, April, 1992, No. 436, eff. 5-1-92; am. Tables 2 to 10, cr. Table 8m, Register, September, 1992, No. 441, eff. 10-1-92.